

This sequence of three posters illustrates how to use an authentic context to design, implement and evaluate a solution. It shows how design thinking can be applied to the processes and productions skills in the Australian Curriculum: Technologies. Depending on the context chosen, students may produce a working model, applying their understanding of systems, materials or engineering.

CONTEXT: DESIGN AND CREATE A SMART WEARABLE DEVICE THAT HELPS YOUNG PEOPLE ENHANCE THEIR WELLBEING AND PRODUCTIVITY

Design thinking (non-linear)

EMPATHISE

Understand the needs of the user in the context of the design challenge.

DEFINE

Define the challenge based on what you learned about the user.

IDEATE

Combine creativity and your understanding of the problem to generate ideas for the design challenge.

PROTOTYPE

Develop basic examples of your preferred design idea.

TEST

Review your prototype against design criteria and user story.

The Australian Curriculum: Processes and productions skills

TECHNOLOGIES

Digital Technologies

Achievement standard

Students develop and modify creative digital solutions, decompose real-world problems, and evaluate alternative solutions against user stories and design criteria. They design and trace algorithms and implement them in a general-purpose programming language.

Content descriptions

Investigating and defining

Define and decompose real-world problems with design criteria and by creating user stories | AC9TDI8P04

Generating and designing

Design the user experience of a digital system | AC9TDI8P07
Generate, modify, communicate and evaluate alternative designs | AC9TDI8P08

Producing and implementing

Implement, modify and debug programs involving control structures and functions in a general-purpose programming language | AC9TDI8P09

Evaluating

Evaluate existing and student solutions against the design criteria, user stories and possible future impact | AC9TDI8P10

Design and Technologies

Achievement standard

Students create and adapt design ideas, processes and solutions, and justify their decisions against developed design criteria that include sustainability. They communicate design ideas and solutions to audiences using technical terms and graphical representation techniques, including using digital tools. They independently and collaboratively document and manage production processes to safely produce designed solutions.

Content descriptions

Investigating and defining

Analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes to create designed solutions | AC9TDE8P01

Generating and designing

Generate, iterate and communicate design ideas, decisions and processes using technical terms and graphical representation techniques, including using digital tools | AC9TDE8P02

Producing and implementing

Select and use suitable materials, components, tools, equipment and techniques to safely make designed solutions | AC9TDE8P03

Evaluating

Develop design criteria collaboratively including sustainability to evaluate design ideas, processes and solutions | AC9TDE8P04

Applying design thinking to an authentic context

Design and create a smart wearable device that helps young people enhance their wellbeing and productivity.

Investigating and defining

Students define and decompose real-world problems developing clear design criteria. They create user stories to identify and understand the needs of the user.

When designing a smart wearable to improve well-being and productivity for young people, the design criteria might include key elements such as:

- functionality and interactivity
- aesthetics and user comfort
- inclusivity.

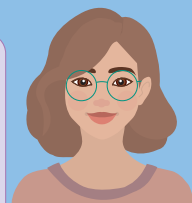
EMPATHISE

A user persona helps to create a fictional character that represents a segment of the target audience. It encourages students to consider various aspects of potential users' lives and needs.

Develop a user story:

- As a **<type of user>** I want to **<a goal>** so that **<reason for the goal or benefit>**.

For example: As a learner who studies for long periods, I want to receive alerts on a wearable, so that I know when I have been stationary for too long, encouraging me to take breaks and stay active.



NAME
EvieGirl800

DEMOGRAPHIC
High school student

BACKGROUND
Extroverted, observant, thoughtful

GOALS
To take regular study breaks

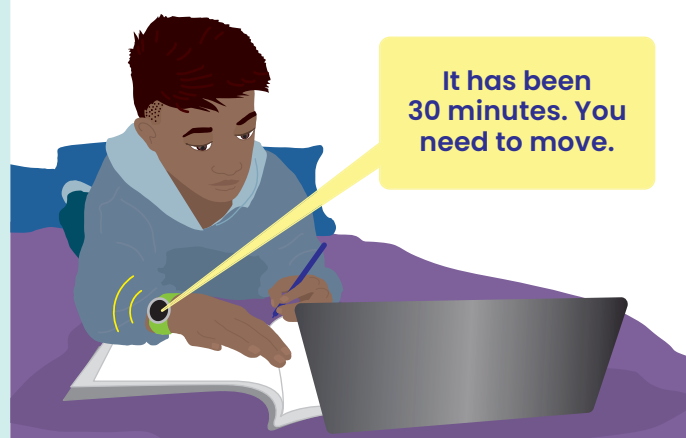
CHALLENGES/NEEDS
Reminder alerts so that I don't forget to take breaks

TECHNOLOGY USE
Wearable

QUOTES
'You can do anything but you can't do everything!'

DEFINE

A clear problem statement is crucial to framing the design challenge. For example, learners often stay stationary for long periods while studying, harming their health and focus. A solution is needed to encourage movement and improve wellbeing and productivity.



Generating and designing

Students generate multiple design ideas creating many and varied possibilities. They evaluate and refine their design ideas by assessing them against these criteria and user stories.

Students collaborate in brainstorming sessions to generate diverse design ideas, fostering creativity and critical thinking. They then evaluate and refine these concepts using established criteria and user stories to ensure their preferred design meets user needs.

IDEATE

Brainstorm a list of functionalities that students might explore when designing a wearable device. These functionalities can be a starting point to consider how their wearable designs can meet user needs effectively.

Use mind mapping to help students visually organise ideas around a central theme, such as health monitoring. This technique allows them to explore various features, user needs and functionalities, promoting creative thinking and generating innovative design ideas.



PROTOTYPE

Sketches: Students sketch out their ideas for their wearable.

Role-playing: Use role-playing to simulate the use of the wearable.

Simple models: Create a physical model of the proposed solution to describe its features and functionality.

TEST

Use the prototype to review and check the preferred design against the user story and design criteria to ensure it meets the design requirements. If elements do not satisfy the design requirements revisit ideation stage.

Applying design thinking to an authentic context

Design and create a smart wearable device that helps young people enhance their wellbeing and productivity.

Producing and implementing

The preferred design idea is implemented and developed into a solution.

Students may use microcontrollers such as micro:bit while those with advanced programming skills may use Arduino-based IDE and wearable tech such as Adafruit.

Examples of implementing a digital solution:

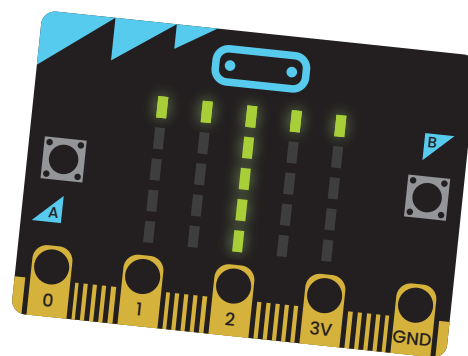
HeartRATE

My wearable uses a pulse sensor to measure heartrate and gives an alert at certain heartrate zones to encourage activity.



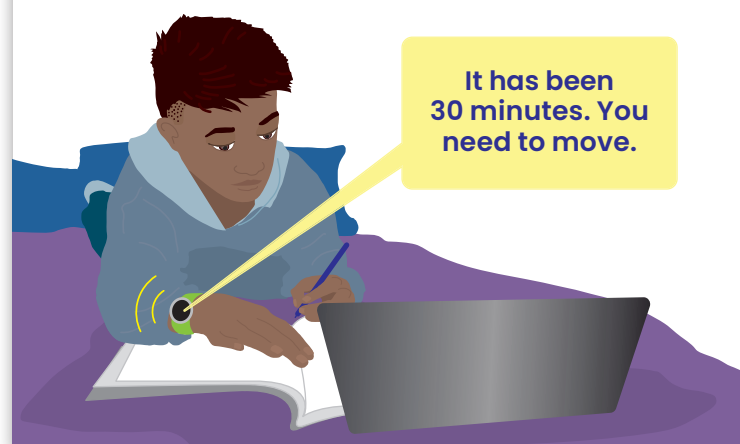
MindfulnessMessenger

My wearable has guided mindfulness quotes that display based on the user's selected emoji, promoting emotional regulation and self-care.



MotionReMinder

My wearable is a reminder to get up and move after periods of inactivity.



MoodGlow

My wearable is made using Adafruit wearable tech. I created a stylish accessory that changes colours or patterns based on the wearer's mood or environment.

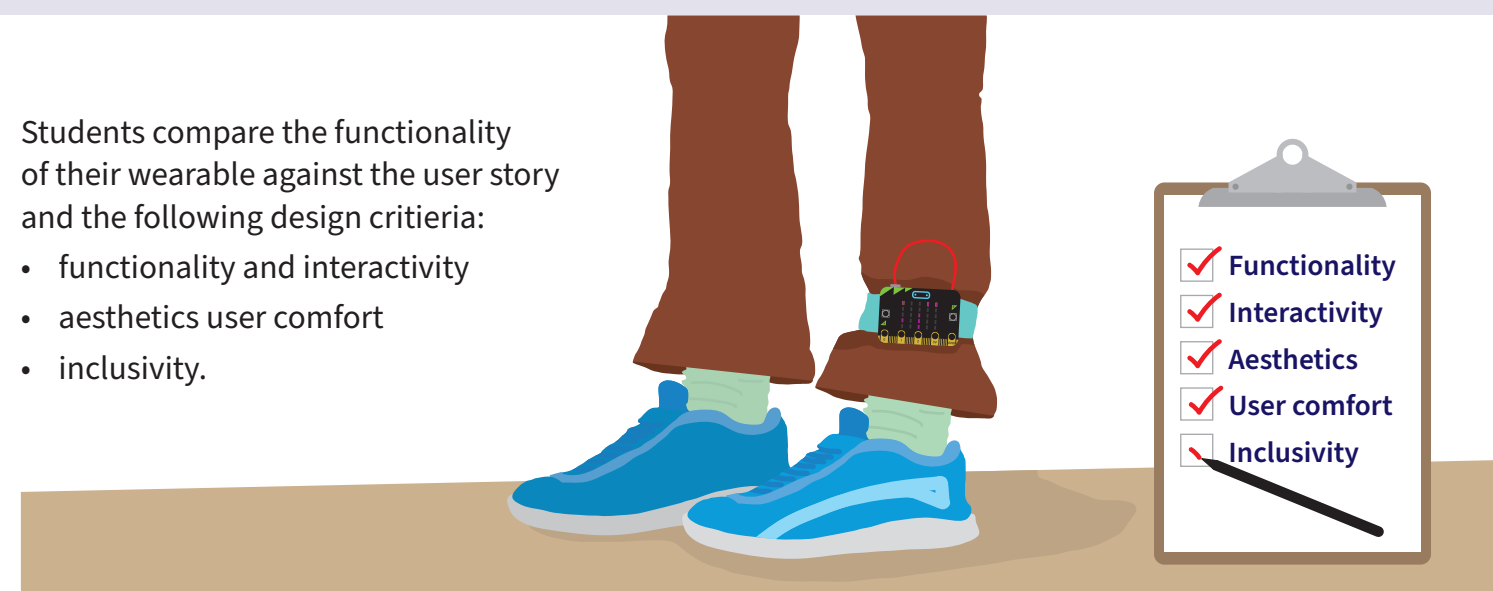


Evaluating

Students evaluate the effectiveness of their solution against the design criteria and user stories. They reflect on the potential future impact of their solution.

Students compare the functionality of their wearable against the user story and the following design criteria:

- functionality and interactivity
- aesthetics user comfort
- inclusivity.



Future impact

Organise a session where students investigate and discuss the potential positive and negative impacts of their wearable on users and the environment.

For example, a student's evaluation of their wearable tech HeartRate:

	Positive impacts	Negative impacts
Physical activity	Enhances activity levels by alerting users to move	May lead to over-reliance on technology for reminders
Health knowledge	Increases awareness of heart rate and fitness levels	Can induce anxiety if users feel pressured by alerts
User motivation	Encourages users to set and achieve personal fitness goals	Users may feel discouraged if they do not meet activity targets
Environmental	Promotes sustainability through health-conscious behaviour	E-waste from discarded devices and batteries can contribute to pollution